



Community Perceptions Toward Preparing for Electric Vehicles

Prepared for AusNet Services, Jemena,
CitiPower, Powercor and United Energy

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A large, dark blue letter 'W' dominates the right side of the slide. It is filled with a complex, glowing pattern of white and yellow lines and dots, resembling a cosmic web or a neural network. The background is white.

Background, objectives and methodology



Background

New electric vehicles (EV) are coming onto the market. In Australia, electric vehicle sales increased 67 per cent from 2016 to 2017. While this is seemingly a large increase, it comes from a low base. In 2017, Australians purchased 1,076 plug-in hybrid electric vehicles, and 1,208 battery electric vehicles, representing 0.2 per cent of the Australian car market¹.

There appears to be little consideration given, in the general public discussion around electric vehicles, to the ability of the grid to handle the increased demand. It is important that the distribution network is prepared to handle the increased demand that the change from (mainly) petrol to electric powered cars will bring about. In particular, the ability to manage the electricity load will need to be navigated.

That said, investment in infrastructure is challenging in an environment where cost of living, and electricity pricing, are top of mind concerns for the general community and electric vehicles are seen to be the domain of those who have some disposable income (i.e. are not 'struggling') due to EV's being, in the main, more expensive than equivalent petrol vehicles.

Investment in infrastructure will help make electric cars more accessible and may also help to speed up the adoption process, in turn assisting to bring down the purchase price – but who should bear the cost of this investment?

To ensure that customer perceptions on this matter are understood, the five Victorian distribution companies jointly commissioned qualitative research to explore the attitudes, perceptions and concerns of Victorians when it comes to preparing for the future of electric vehicles. Importantly, the distribution companies wish to gain insight into how the broader community reacts to information around the benefits of such investment.

It is important to note that the purpose of this qualitative research was to uncover consumer response (initial reactions, thoughts, concerns, questions) to information about investment in infrastructure to prepare for electric vehicles. **It is beyond the scope of qualitative research to identify the extent to which people support such investment.**

¹ Source: 'The state of electric vehicles in Australia', ClimateWorks Australia, June 2018, downloaded 17/7/19 from <https://www.aph.gov.au/DocumentStore.ashx?id=be4e9b0a-bf39-442f-8acb-9830038f3617&subId=658041>



Research objectives

The key objectives of the research program were to explore:

- Victorians attitudes to electric vehicles: What do people know about them? Do people consider them to be part of a sustainable and clean energy future?
- What is required to make electric vehicles more accessible? How can this be facilitated? Who needs to drive this?
- How do people feel about the need to invest in infrastructure to prepare for a future with electric vehicles? Is this important? Are they supportive of this? What questions do they have? What are the key considerations?
- What is the benefit of doing this – to them personally, to the community as a whole? Who should bear the cost?

Specifically, the research was designed to provide a comprehensive understanding of:

- The preparedness of customers to agree that distribution businesses need to plan, explore, trial and invest to prepare for the future of electric vehicles.
- What information assists with understanding the need to do this.
- Support for 'incentivising' electric vehicle charging at appropriate times to the benefit of the network.
- What information provides an understanding that any investment now (in trials, innovation, etc.) is a shared cost, but also creates a shared benefit.



Qualitative research methodology

Qualitative research in the form of **face-to-face and online group discussions**, were conducted with people from metropolitan and regional locations across Victoria. The group discussions were structured as follows:

Group type	Participants residing in the following locations:	Younger (25-54 years)	Older (55+ years)	Total
Face to face focus groups	Melbourne: CitiPower (city and inner suburbs), Jemena (northern and north-western suburbs), and United Energy (southern suburbs and Mornington Peninsula) customers.	1	1	2 groups
Online group discussions	Regional Victoria (including outer metropolitan Melbourne): AusNet Services (outer northern and eastern suburbs and eastern Victoria) and Powercor (western suburbs and western Victoria) customers.	1	1	2 groups
Total		2	2	4 groups

Eight to nine participants took part in each face-to-face group discussion, and 16 to 17 people participated in each of the online group discussions. A mix of genders, ages, education and socio-economic status were represented within each group discussion. Qualitative group discussions were conducted on 12th August 2019, online group discussions ran from the 13th to the 15th August 2019.



Executive summary



Snapshot of key findings

EV's perceived as expensive, limiting accessibility

The current price point of electric vehicles drives a perception that they are for 'the wealthy', and makes it difficult for customers to envisage owning one. In addition, better charging accessibility outside of homes is needed. There is a perception that travelling long distances is problematic, due to a lack of charging stations.

Customers accept that planning for the future is needed

The population is growing and distribution companies should plan for the future. Customers understand that investment in our electricity network will be required. New technologies are part of progress, and if we are to progress, infrastructure must keep up.

Mixed views on who pays for upgrading the system

While there is agreement that investment is needed, customers are divided on how this should be funded. Some argue that everyone should carry some of the burden, as we all use the system. Others want to see a 'user pays' approach. Importantly, there is a view that vulnerable people should be protected from bearing costs.

'Trials' to prepare for EVs are not well understood

The need for testing and trials, analysis, modelling and innovation to prepare for the future of electric vehicles is not well understood. While acknowledging there is a need to be prepared for the future, customers are concerned about uncapped expenditure. Some customers believe costs should be shared across all parties.

Using tariffs to shift charging away from peak demand generally supported

Encouraging electric vehicle owners to charge during off-peak periods is an intuitive solution and one that is mentioned spontaneously. Offering owners time of use tariffs is supported, as this is seen as a way to reduce the strain on the system during peak periods and potentially reduce the need for major upgrades.



There is a need to be prepared for the future

People understand that demand for electricity is increasing

The number of appliances drawing electricity in the home is increasing, with many households having multiple televisions, computers, mobile phones and other devices that need charging.

There is an expectation that the future will involve more household solar generation. Battery technology, along with solar panels, is anticipated to become more broadly accessible and affordable.

Electric vehicles are not top of mind considerations for households as yet, to the extent that solar panels are.

Infrastructure must keep pace with population growth and technological improvements

People agree that infrastructure needs to keep up with the needs of the community. This view holds across many sectors, not just energy. People cite road infrastructure and the NBN rollout as examples where infrastructure has lagged community needs.

There is a belief that the sector needs to be proactive to ensure electricity is there when needed and to support technologies that encourage progress and improved quality of life.

The idea of electric vehicles being commonplace is still some way into the future

Many people find it difficult to envisage owning an electric vehicle in the near future. The price tag means that they are perceived to be for wealthy people.

Furthermore, there is a perception that the driving range between charges for an electric vehicle is low. With charging stations not as prevalent as petrol stations, people fear being stranded with a car that has run out of charge.

That said, there is an expectation that these factors will improve over time, and that the price tag will come down and the technology will improve.

Views on the benefits of electric vehicles are mixed

People are unclear whether running costs for an electric vehicle are less than for a petrol engine car. While the price of petrol is considered to be high, so too is the cost of electricity.

Reducing our reliance on petrol is seen as a positive step toward reducing emissions and improving the environment. However, the fact that electricity for the grid is mostly sourced from fossil fuels is seen to negate the environmental benefits.



The electricity grid is already under pressure

People understand that the electricity system struggles to meet demand at times

Blackouts at times of extreme heat point to the fact that the grid already reaches capacity. Increasing numbers of electric vehicles are expected to exacerbate this situation.

There is an understanding that charging cars from household solar panels may serve to reduce the impact on the grid, but this is not seen as the sole solution – particularly as cars will most likely be charged overnight, when solar panels do not produce energy.

All of this points to a need to invest in improving the grid to meet demand.

The term ‘peak demand’ is not well understood

Once explained, people understand the concept of ‘peak demand’, but it is not well understood on a top of mind basis. There is an expectation that the frequency and length of peak demand periods could increase as our reliance on technology (appliances and devices) increases. This drives a view that upgrades to the electricity system will be required.

Infrastructure upgrades to cater to ‘peak demand’ should largely be paid by all

People differ in their view of how this should be facilitated. Some people believe that as everyone uses electricity, this needs to be a shared cost. Other people believe it should be funded by government (through taxes), as this effectively applies a form of ‘means testing’ – people who pay higher taxes will pay more.

Notwithstanding, it is important to be mindful of vulnerable people. The community believes that strategies need to be employed to ensure that vulnerable, low income people are exempt from infrastructure improvement costs or that they are compensated in some way.



Electric vehicles will place further pressure on the grid

The purchase of an electric vehicle is equivalent to adding a small house to the grid

This is 'new news' to people, and clearly demonstrates the impact on the grid of electric vehicles. It raises concerns about the preparedness of the grid for the future.

People agree that electric vehicle owners should be incentivised (through tariffs) to charge their cars during off-peak periods – this is a solution that makes sense.

Costs for trials and innovation to prepare for electric vehicles should be borne by 'others'

The idea of the general community bearing the cost of testing, trials and innovation to prepare for the future demand for electric vehicles does not sit well.

People interpret this phase of preparation as 'research and development' – a cost which should be borne by industry. Alternatively, people perceive that governments have a responsibility to fund research and development for advancements that will benefit society as a whole.

There is an argument for funding to be a shared responsibility

Electric vehicles are but one factor that contributes to the increasing pressure on the electricity grid. Population growth and increasing use of technology are other factors.

There is an expectation that consumers pay for essential services and infrastructure in general, and this is no different. However, typically these are funded through taxes.

People want to understand what the cost impact will be at an individual level

An investment of between \$6.3 and \$9.7 billion over the next 25 years provides some context, but people are unsure what it will mean for them individually – this is the information that they seek.



Strong positive sentiment toward solar energy

Solar panels are perceived to be more accessible and good for the environment

People are familiar with the increasing penetration of solar panels on homes. These are seen to be more popular and more affordable than electric vehicles. Solar panels can also reduce the load on the grid and assist with reducing the reliance on fossil fuels. There is a strong positive halo that sits around solar panels.

Some resistance to a shared cost for infrastructure investment to accommodate more solar

As with electric vehicles, there is a view that 'user pays' should apply when it comes to solar panels. However, again there is acknowledgement that solar panels are one factor that contribute to pressures or demands on the grid infrastructure.

The idea of increasing the amount of renewable energy in the grid is seen as a shared benefit. The idea of individual solar panels increasing the amount of renewable energy in the grid is therefore intuitively understood to be a shared benefit.

There is a concern that increased costs for solar users (e.g. high tariffs, high connection fees or an inability to feed into the grid) may discourage people from installing solar panels in the future, thus impacting on this shared benefit.



Potential benefits of time of use tariffs for electric vehicles

Ensuring electric vehicles are charged outside of peak demand periods intuitively makes sense

This is considered a tangible solution to minimise the impact (and associated costs) on grid infrastructure.

The wider benefits of electric vehicle uptake are not convincing

The idea that the wider community benefits from greater uptake of electric vehicles are considered to be future focussed. When explained, people understand that electric vehicles have the potential to bring the unit cost of electricity down for all users (greater demand could push wholesale prices down). They also understand that electric vehicles could use their battery stored power during periods of peak demand. However, people find it hard to envisage how this would be managed, and if in fact it could be facilitated. It feels a bit 'pie in the sky'.

There is some sense of a wait and see approach

The uptake of electric vehicles to date is perceived to be low. As a result, some people are hesitant to support funding innovation and infrastructure upgrades for a scenario that may not eventuate. There is a balancing act to be managed between being prepared and over-spending.

Offering a time of use tariff for electric vehicles is supported

There is strong support for electric vehicle owners to be offered a time of use tariff. However, people feel it is unfair to force existing electric vehicle owners onto such a tariff, as they were not able to make an informed choice at the time of purchase.

There is some support for the idea of making time of use tariffs mandatory for people who purchase electric vehicles in the future – this enables people to make an informed choice and serves to reduce the pressure on the grid.

Even so, there is a view that at this point in time, people who buy electric vehicles are not 'cash-strapped'. This means that they may not be motivated by a time of use tariff, convenience may serve to outweigh cost and they just charge it when it suits them best.



Key messaging considerations

Keep it simple

People accept, and expect, that distribution companies will ensure the electricity grid caters to an increasing population and the widening use of electricity. This will be achieved through infrastructure upgrades and innovation that prepares for that.

Shared costs for a shared system

Almost all Victorians use the electricity network – and thus it makes intuitive sense that costs for managing this network are also shared. Information that can link investment with shared accessibility or benefits of new technologies will be welcomed (e.g. increasing solar panel feed in ability).

Talk about new technologies rather than electric vehicles specifically

Information needs to centre around catering for adoption of new technologies as a whole and not focus specifically on electric vehicles. Messaging about the need to upgrade infrastructure to cater for increased adoption of electric vehicles leaves distributors susceptible to backlash – for many people they are not a realistic option.

Environmental benefits are shared benefits

Opportunities to point to environmental benefits convey a justification for a shared cost responsibility. However, at present, electric vehicles charged from coal-fired power do not present clear opportunities for reduced emissions. The future may be different, but care needs to be taken if this link is to be made.

Time of use tariffs make sense

Managing the demand created by electric vehicles is understood (when explained). Time of use are supported as a mechanism to reduce the impact on peak demand, although initially at least, customers believe electric vehicle owners should be provided with a choice to adopt these.

A large, stylized letter 'W' graphic that serves as a background element. It is filled with a satellite night map of the United States, showing city lights and road networks. The 'W' is positioned on the right side of the slide, with its leftmost vertical stroke extending towards the center.

Detailed findings



Issues landscape



Top of mind contributors to electricity bills are typically within the home

Temperature control, heating water and use of appliances are perceived to be the major contributors to household electricity bills.

- The energy source used to heat and cool households has a major impact on electricity bills.
- Similarly, the type of hot water system used in a household impacts bills. Electric hot water systems are more costly than gas or heat pump systems.
- The age, quality and type of appliances in a household. Old fridges in particular are identified as consuming more electricity than newer models.
- There is some mention of connection and supply fee as a contributor to the overall bill, but not as a primary contributor. That said, people admit that electricity bills are confusing – particularly when attempts are made to compare retail tariffs, discounts and offers.

Type of heating and cooling system

Efficiency of appliances

Weather

Time of day

Daily activities

Connection or supply fee

Type of hot water system

House insulation

Solar panels



“Central heating is the big one, especially in winter. It’s a gas system, but still needs electric fans to blow heat around the house. Aside from that, it’s the usual; fridge, washing machine, TVs, computers, lights. Hot water is instant gas, so negligible electricity costs there. Lighting is all LED, so not much more to be gained there either.” (Regional, older)

“Comfort comes at a price, keeping all those air conditioners, refrigerators, chargers, and water heaters going makes household energy one of the largest uses of energy in this country.” (Regional, younger)

While customers do their best to reduce their bills, many things are beyond their control (or their budget)



Monitoring appliance usage, turning off lights, avoiding using the clothes dryer and paying bills on time are ways that customers try and reduce their bills.

However, **there are aspects that are simply beyond ones control which can significantly increase electricity usage and ultimately bills.**

- Weather can be a major determinant of the need to use electricity as it drives a need to heat and cool homes.
- The quality of insulation in a house is something that may also be beyond ones control – either from a practical sense (e.g. renters) or a budgetary sense (e.g. people don't have the funds to add insulation). This can have an effect on the extent to which homes need to be heated and cooled.
- The number of people present in a household can make bills more expensive. More people increases the use of appliances and lighting.
- There is a perception that solar panels on homes would significantly reduce bills. While some people are in a position to install solar panels, for others it isn't an option (e.g. they are unable to afford them or they rent). Having solar panels on a home remains an aspirational goal for many people.

"Relying on an electric pump for water is really expensive. We have looked into installing an underground pump, as we have had two issues with our current pump costing \$300 over the past 12 months even though it's relatively new. A new state-of-the-art pump would be a minimum \$2,000 plus installation which is not a cost we can take on at the moment." (Regional, younger)

"You can adjust the time of day and try to avoid peak periods." (Melbourne, younger)

"To me, solar power will be the biggest cause of expense for those who don't have it... I haven't yet installed solar panels, but I think I'll have to soon. Current running costs are being helped by more power-efficient domestic items and LED lighting." (Regional, older)

"We've had a really cold winter in Melbourne, we can't control that too much." (Melbourne, older)

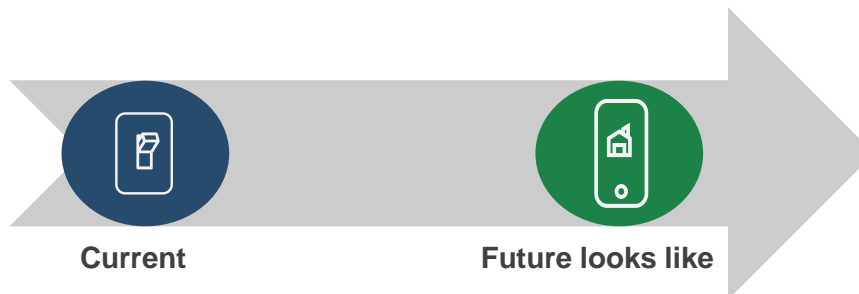
People envision a future where households generate their own power and ‘smart’ homes are the norm



Electricity generation and supply in the future are anticipated to involve more household solar generation. In addition, there is an assumption that battery technology, along with solar panels, will be more broadly accessible and affordable – meaning that households will be able to store the power they generate from solar panels. Electric vehicles are not top of mind considerations for households as yet, to the extent that solar panels are.



There is also an expectation that **new technologies will further integrate functionality of appliances in homes**, with a belief that these will be controlled from smart phones (akin to ‘Google Home’ technology, a smart home voice activated control hub).



“Our home and others ideally will be solar powered which would hopefully make electricity prices cheaper. Tiles, window panes and paved streets that are solar panels in themselves and improved, cheaper solar batteries and panels would make generating and storing electricity cheaper and more efficient.” (Regional, older)

“Renewables spring to mind as an alternative source of energy, but I don't think that they will see widespread adoption unless the market price of power goes so high as to make it mandatory, or the price of power banks / solar panels comes down enough to make them attractive to home owners.” (Regional, younger)

“Down the track, the internet is making it more accessible... from your phone you'll be controlling things in your house.” (Melbourne, older)

A large, stylized letter 'W' is formed by three dark blue, slightly curved vertical bars. The interior of the 'W' is filled with a satellite image of a power grid at night, showing a dense network of glowing white lines (power lines) and bright yellow-green nodes (substations or power plants) against a dark background of land and water.

The electricity system and pricing

Depth of knowledge on how the electricity system works is shallow



There are **varying levels of understanding on how our electricity system works**. Some people understand the process of how electricity make it to homes. However, terms tend to be general and colloquial. With some exceptions, terms such as *generation, transmission, distribution, metering* and *retail*, tend not to be common language used by customers.

For other people, the manner in which electricity is **delivered to their homes is not given much consideration and so the process is difficult to articulate**.

Most people understand in basic terms that electricity is generated from a fossil fuel or renewable source and then carried to homes through wires.

"I have a basic understanding of the system. The grid comes from coal fired power stations mostly and travels through the huge overhead cables around our state and we even swap power with other states sometimes. Then on smaller poles to our houses." (Regional, older)

"I know a little bit but would not be certain my information is correct. My understanding is a natural resource is mined (mostly coal) which is then burnt and the energy from the burning converted to electricity by which it is then transported to users." (Regional, younger)

"You generate it in some sort of plant, that's transported down copper wires that come to the suburbs, that goes to the street wires and that goes to your house." (Melbourne, older)

"There's the mining industry, coal gets transported, burnt at an energy producing facility, electric cables bring it to people's homes." (Melbourne, younger)



"I don't know how the process works... My retailer is Origin and my distributor is Powercor." (Regional, older)



The breakdown of electricity bills is interesting but isn't 'need to know' information

People are largely unaware of the components that make up the electricity bill and their associated contribution. Information on the make up of the bill is typically 'new news', but not information that makes a difference to people. *(The information provided to group participants may be found appended to this report.)*

Given little consideration

Customers tend not to have the time to consider how their bill is divided.

Out of their control

Customers feel they can't impact the individual components that make up their bill. They are more concerned with what they can do in their homes to reduce overall costs.



Can be interesting

The information is interesting, but not important.

Questions arise

The information can lead to questions and concerns on how the costs are divided among the companies in the supply chain (namely, whether the amount is justified at each stage).

"No, I didn't know the distribution costs were such a large percentage. I have never looked at a breakdown like this before and I'd like to know why it's so high. I appreciate this information." (Regional, older)

"Honestly, with three young kids and the hectic lifestyle lived today I'm really not all that concerned with the breakdown of my electricity bill. My only concern is the total bill cost and trying to get the best deal possible to get it as cheap as possible." (Regional, younger)

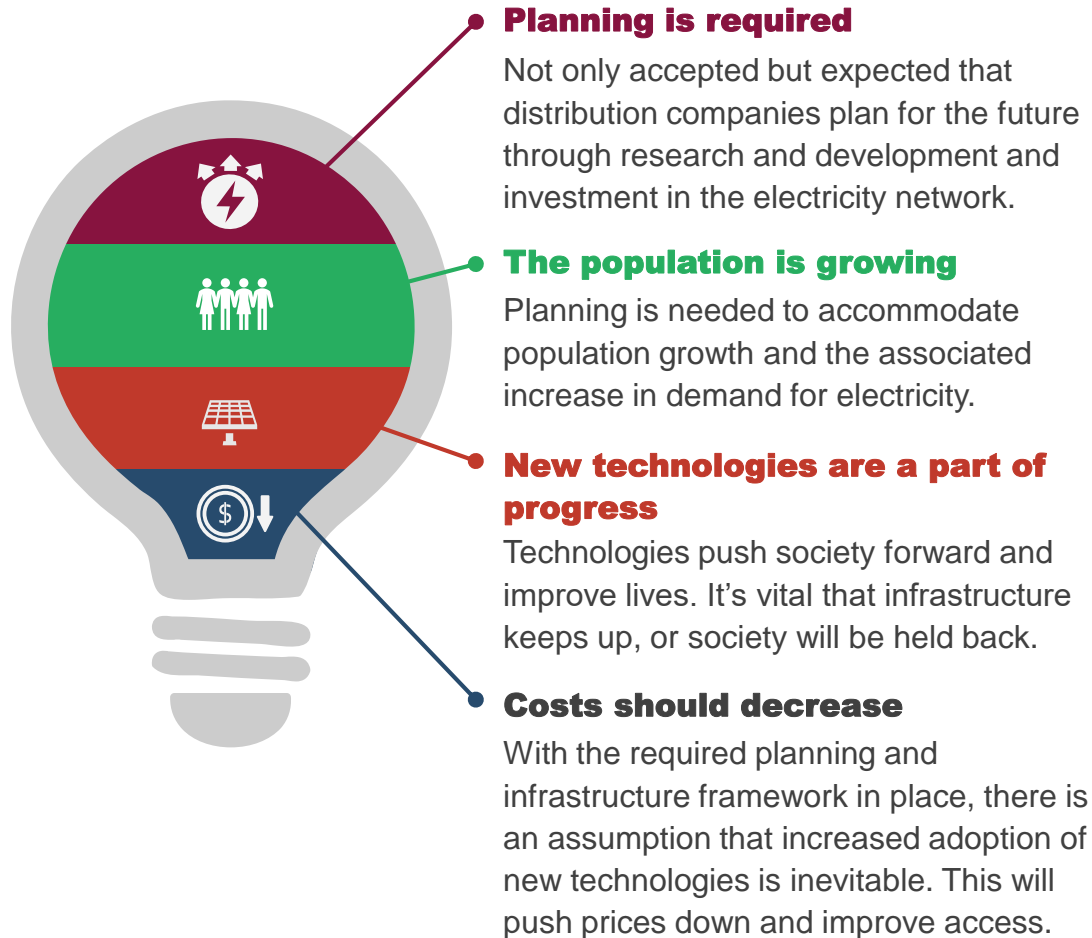
"Honestly, I have never thought about it. No, it's not important to me because there is nothing I can do about it." (Regional, older)

"You've got to pay it anyway, it's a cost of living." (Melbourne, older)



The need to plan for the future is a given and distribution companies are no exception

Population growth and constant technological improvements means that infrastructure must keep pace and provide a framework for the overall cost of new technologies to decrease. Customers tend to accept that distribution companies need to plan for the future – noting that this view holds across many sectors, not just energy.



"All the companies in the supply chain will and are planning for the future and the electrical industry as a whole is continually doing this, with new and more efficient technology coming into play continually. What I see many times is companies using 'new' technology as an excuse to increase prices to their consumers when the uptake of new technology should be reducing costs, not increasing."
(Regional, older)

"Yes, failure to do so would be dangerous. We need to be proactive about testing the potential impact of new technologies that rely on the electrical grid, especially when business, industry and day to day life is dependent on electricity." (Regional, younger)



Impact of increasing EV uptake



Knowledge of electric vehicles is framed around price, running costs and technology



Expensive to buy

'High' price drives a perception that electric vehicles are for the wealthy. Given the relative cost compared to petrol vehicles, it is hard for most people to envisage owning an electric vehicle in the near future.

"I know Tesla is a brand that make them, and the cost of running in relation to buying petrol would be much cheaper. I'm sure I've read somewhere that they are an expensive car to buy, so at the moment, I'd guess that only a small percentage of people in Australia would purchase them. My perception is that a lot of Hollywood stars drive them."
(Regional, younger)

May be cheaper to run

Still some uncertainty on whether running an electric vehicle is cheaper than a petrol car. While it is acknowledged that petrol is expensive, the cost of electricity is also considered to be high. People are unsure how much electricity is needed to charge electric vehicles.

"I really do not know very much about electric vehicles other than you save money on petrol but with all of the charging of the batteries from home (I would think) it makes me wonder if you save money as a whole." (Regional, younger)

Advancing technologically

Recognition that improvements in electric vehicle technology are constantly being made. Drives a perception that cars will be able to drive for longer on a single charge.

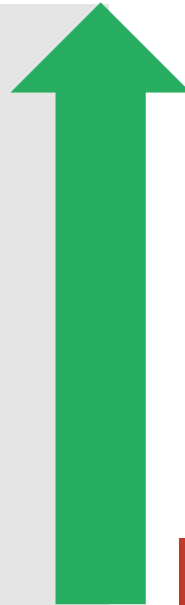
"Good technology. Quiet, efficient and can be incredibly fast (not necessarily a good thing). Distance driving is still an issue due to limited recharging options and recharge times, but as battery technology improves that will also get better." (Regional, older)



Electric vehicles might be better for the environment, but the purchase price is prohibitive

Good things about electric vehicles:

- ✓ Better for the environment as they do not emit emissions when driving.
- ✓ Potentially cheaper to run compared to a petrol car.
- ✓ Can reduce the population's reliance on petrol/ oil.
- ✓ Creates increased consumer choice, in turn creating more competition amongst manufacturers.



"I still don't think they solve the issue of pollution and climate change, even though the fuel is not being burned in the car, it is still fossil fuels." (Melbourne, younger)

"It's (an electric car) dangerous, people can't hear you coming." (Melbourne, older)

"I think the biggest drawback at the moment would be finding charging stations." (Regional, older)

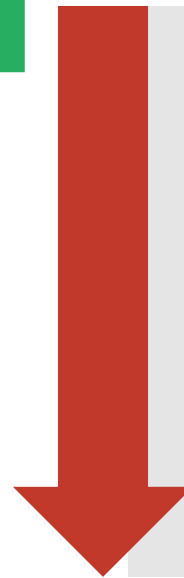
"It can save me costs, of maintaining the car, at the moment I have a lot of costs, like petrol." (Melbourne, younger)

"I have heard that they are considered environmentally friendly, they're quiet and economical." (Regional, older)

"Love the fuel economy and also so much less pollution on our streets." (Regional, older)

Downsides of electric vehicles:

- ✗ The purchase price make them unattainable for most people.
- ✗ The main reliance of the grid on fossil fuels means the power source will be mostly non-renewable.
- ✗ Charging is difficult as the perception is that there are not many charging stations.
- ✗ Electric vehicles can be dangerous as they are much quieter than petrol cars (pedestrians don't hear them coming).



There are different perceived benefits of electric vehicles for the individual versus for Australia



Spontaneously mentioned benefits for individuals tend to be linked to reduced running costs

For customers, the potential benefit of electric vehicles to them personally relate to lower running costs. This can be due to:

- Not having to pay for petrol. General assumptions (for some people) are that electricity would be a cheaper source of fuel than petrol.
- Electric vehicles may be cheaper to service and maintain; some people perceive there are fewer engine parts.

There is some recognition that reduced emissions is better for individuals. Customers do not intuitively draw a connection between increased electric vehicle ownership and a decrease in overall electricity costs.

Benefits for Australia as a whole tend to be focused on better environmental outcomes

Reduced emissions are the primary (and for many people, only) benefit to Australia. Views on this are somewhat mixed, as there is acknowledgement that much of our electricity still comes from coal-fired power.

There is some mention of reduced dependence on oil in general, which can be a costly and hard to secure resource.



“Personal benefit would be not paying for petrol. Will my local mechanic be able to work on an electric car? And for the environment, they still have to use the electricity, I don’t think more people on the roads in an electric car is going to help the environment, they need to get off the roads.” (Melbourne, younger)

“There are less moving pistons to go wrong. The cost of getting serviced all the time is probably cheaper.” (Melbourne, younger)

“If more people go electric it reduces the pollution. The pollution problems are difficult in our cities and particularly in Melbourne where sometimes the pollution just lies over the city. For Australia it takes pressure off our oil supplies as we don’t produce much and we apparently have very little reserves of oil.” (Regional, older)

“Cleaner air generally is a very attractive personal benefit to me, but I am also curious about the offset value of the generation of the electricity. Is a car cleaner if it burns coal or petrol? I would like to know if the electric cars can be guaranteed to run off solar or wind generated electricity rather than traditional forms.” (Regional, younger)



Price point, followed by recharging accessibility are key to increasing accessibility of electric vehicles



"Initial vehicle purchase price is substantially higher than its equivalent petrol versions. Maybe the government can offer incentives to purchase electric, e.g. discounted registration, etc."
(Regional, younger)

"Cheaper purchase points, tax non electric cars! Make recharging more accessible. Reduce the cost of batteries for homes, further incentives. It needs to be led by government initiatives. It will be hard to go against the oil industry." (Regional, younger)

"From an environmental standpoint, the government should get behind it, put solar panels on petrol stations so we are filling up on green fuel, but the petrol companies are going to want you to keep buying cars. We want to be environmentally friendly but we can't afford it." (Melbourne, younger)



"The price would have to be affordable for all. The government needs to help with this." (Regional, older)

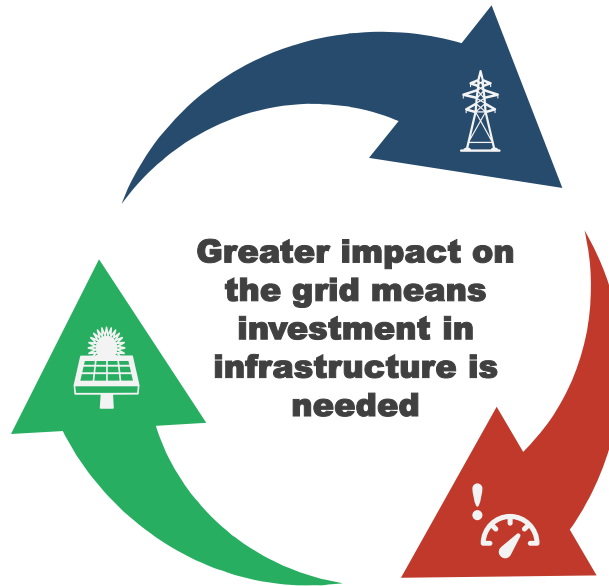
"They will have to supply power points to charge the cars in more locations. Lower prices which the government would have to help with if they want people to own them." (Regional, older)

There is unprompted recognition that electric vehicles will put extra strain on a system that is already struggling



Solar can minimise risk

There is a view that the potential strain on the network could be reduced by people charging their cars through personal solar-produced energy, but this is not the sole solution (cars will also need to be charged away from home and overnight).



The electricity system is already struggling

The network is perceived to be in need of upgrades due to blackouts that occur in summer from high electricity usage.

Electric vehicles will put increased strain on the system

Immediate assumptions are that electric vehicles will further exacerbate the issue due to the increased demand for electricity.

"We're actually buying more than what we're producing... More electric vehicles means more pressure on electricity and more cost." (Melbourne, older)

"Of course we would need to invest. You can't encourage the population to invest in something electrical but then not provide sufficient power!." (Regional, older)

"The grid will collapse, as more electric vehicles are being driven. We will need electric vehicles to have their own solar source, as this would help towards easing the electricity network from being over loaded." (Regional, older)

"The current network can't support more feed in to the grid of solar, let alone voltage issues that will be caused by more batteries and cars charging. Major infrastructure reworks are required immediately." (Regional, older)



Peak demand and investment in infrastructure



The term ‘peak demand’ is not well understood

‘Peak demand’

In the main, unprompted understanding of the term ‘peak demand’ tends to be perceived in two different ways.

A few times a year

✓ Some people understand that ‘peak demand’ occurs on the few days a year where electricity usage is at its absolute highest. This is linked to blackouts in summer due to air conditioners.

“In the summer time, when everyone is using their electricity and their air conditioners and we have a black out.” (Melbourne, younger)

Daily occurrence

✗ Some people mis-understand ‘peak demand’, believing it applies to daily surges in electricity usage – in the evening when people return home from work.

“I assume peak demand is when there is a huge increase in electricity usage at the one time. Not sure of times but early evening, around meal time through until about 11pm.” (Regional, older)

Further, the term ‘peak demand’ is similar to other electricity related terms such as ‘peak’ and ‘off-peak’ tariffs. Some people can confuse the various terms and interchange them, resulting in a misunderstanding of which term applies to each situation.

“When I was younger, ‘off-peak’ meant late night to early morning when people weren’t using so much electricity. Users were encouraged through a much lower tariff to run electric stored heat (heats a full tank) hot water units and other high energy items during this time. Now, with more people using central heating and air conditioning units, I’m not sure if peak demand can be fixed to a time frame any more.” (Regional, older)



Once explained, peak demand is a concept people can understand

In the future, global warming and more extreme weather conditions are seen to likely increase the frequency and length of peak demand periods. Population growth will also have an effect with more people requiring power.

New technologies such as electric vehicles are understood to not only increase the amount of electricity needed during peak demand periods, but also extend peak periods. Further, there is a perception that our reliance on electricity becomes greater over time as the number of products and devices used in homes increases exponentially.

Comparing life today with that of the past provides an indication of how our electricity usage has increased. Households used to only have one television, one fridge, etc., whereas today it is not uncommon for many homes to have numerous appliances and devices that all require electricity.

These factors drive a view that the electricity system will require constant upgrades to cope with future demand.

(The information provided to group participants explaining 'peak demand' may be found appended to this report.)

"People rely on electricity more and more as time goes on. More appliances, perhaps charging their electric vehicles and new technologies in the future. This would expand our peak periods for sure." (Regional, younger)

"I haven't heard of this before but I understand now how blackouts occur and why. I'm not sure how we can change the actual peak times when the vast majority of the population do the same things everyday, perhaps again educating the public about these times and it seems the government will have to invest in upgrades to transformers and other network infrastructure." (Regional, older)

"With our uptake of more and more technology in our homes and businesses, demand will always increase. I think the statement 'Electricity demand reaches its maximum levels usually only for a few days each year in summer' is not accurate and will and does happen more often than this." (Regional, older)

"I'd imagine that global warming and longer periods of consecutive hot days over summer would effect periods of peak demand. If you had a greater rate of adoption of plug in electric vehicles needing to be charged during peak times, that would place serious stress on the grid." (Regional, older)

"Obviously demand is going to go up... the amount of apartments that have gone up in the area as well... when I was a kid, you had one TV in the house." (Melbourne, older)



There is a need to plan for future energy demand

As mentioned previously, people believe that across many sectors, there is a need to plan for the future – road infrastructure and the NBN are examples cited where required infrastructure has not kept up with population growth.

To this end, when learning about peak demand and changing technologies, customers similarly agree that there is a need to be prepared for the future.

"We have to think of it like superannuation, you've got to plan for your future." (Melbourne, older)

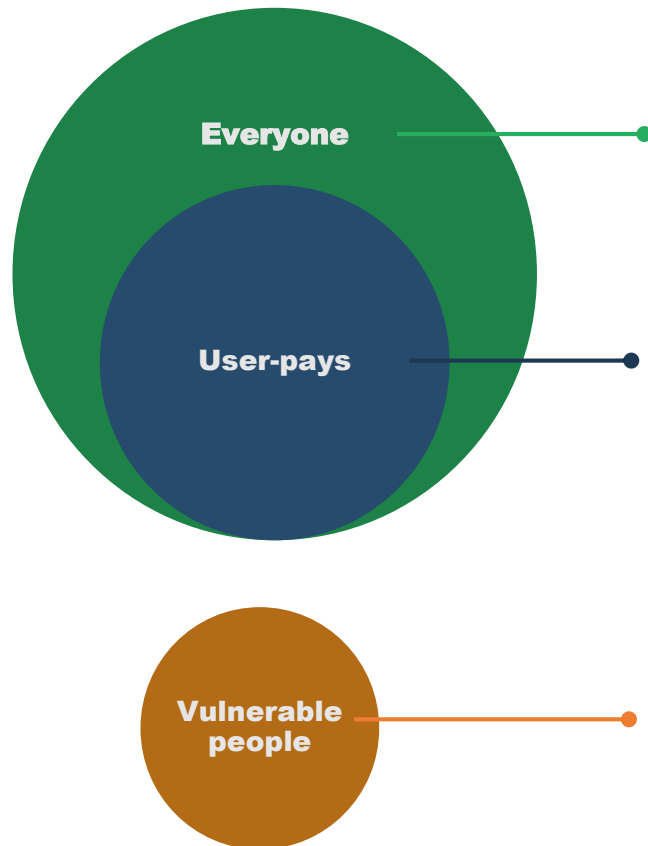
"It worries me for the future. We need to plan for this now (or yesterday!). Ideally with further investment in solar (both household and commercial) this will assist, as will the uptake in VPPs (virtual power plants) which is the aim of the battery rebate scheme." (Regional, younger)

"Yes, I am aware of how this peak period works. I never thought of it from the distributor perspective though... so yes, it definitely makes sense that they would need to upgrade powerlines, etc." (Regional, younger)

"I would question why the capacities of the network haven't been upgraded. This problem isn't a new one. In this day and age surely someone can say, 'let's fix this' and spend some money as our weather gets hotter, blackouts will occur more often." (Regional, older)

Views differ on who should bear the cost to upgrade the system to meet future demand

It is understood that the system needs to be upgraded in the future, but who should pay to upgrade the electricity system to meet peak demand?



'Everyone should pay' considerations

- Everyone uses electricity. People cannot predict their future use and may have a need to use it during peak times. With this in mind, everyone has a responsibility to contribute to costs.
- The government should use taxes to upgrade the system; this ensures a form of 'means testing'. Once infrastructure is established, end users will pay according to their consumption.

'User-pays' consideration

- Those that are already struggling to pay their bills would be protected from increased costs.
- Big business seen to be a major contributor. Those who aren't contributing as much to peak demand shouldn't have to bear the cost as much as higher users.
- Concerns that if everyone pays, extra revenue generated would go to profits. User-pays helps minimise this.

Vulnerable people

- Should be protected or exempt from bearing costs of upgrades.
- It is unfair to charge according to how much people contribute to peak demand, as vulnerable people may only be able to afford less energy efficient appliances.
- The government should offset the costs that vulnerable people would need to contribute.



Meeting peak demand in the future:

Select verbatim comments

Who should pay to upgrade the electricity system to meet peak demand?

"Everyone should pay for it, because the price of electricity will go up. If I'm a person with an electric car, I will pay for more litres of electricity. The distributor fees will just get built in, unless the government says it is an environmental thing." (Melbourne, younger)

"I think it could be like the smart appliances, the expectation that your fridge will always be on, there is going to be this increase to have electricity to power these modern homes, then maybe there is an argument that everyone should share this cost." (Melbourne, younger)

"Everyone should pay towards upgrading the grid shared evenly. Though you may not require much electricity currently during peak periods, there may come a time down the line where you do and when you do it's only fair that you contributed towards the cost of the upgrades." (Regional, younger)

"The Government should pay for these upgrades. Asking customers to share the cost would put strain on those struggling to afford power, I can't see myself finding any more money to put into these costs, and people that cannot afford to use heating or cooling at the moment should not be impacted." (Regional, older)

"I think everyone who contributes to peak demand should be paying the most, big businesses. If you're not using electricity in peak times then it doesn't seem fair to have to pay but then vulnerable people who rely on life saving appliances definitely need to be compensated." (Regional, older)

"Vulnerable people shouldn't have to contribute to upgrade costs. Perhaps it should be distributed around how much peak power people use, especially large corporations who rely on huge electricity use during peak periods would contribute more than say a small family home." (Regional, younger)

"Vulnerable people would be the exception to this, e.g. low income, carers, families of the very young, elderly and people unable to work due to legitimate medical reasons. Their costs should be offset by the government." (Regional, younger)

"I'm not sure I'm comfortable charging people based on how much they contribute to peak demand. However if someone is taking steps to lower their energy use and others aren't, that does raise something to consider. However, many vulnerable people in society are often those less likely to be able to afford low rating appliances, solar panels and insulation or be able to make substantial changes if they rent." (Regional, younger)



Infrastructure investment for new technologies



There are a range of view on who should pay for electric vehicle trials

It is generally accepted that the electricity system will need to be upgraded to meet future demand and cater for new technologies. However, when it comes to exploring alternative options for electric vehicles through testing and trials, analysis and modelling and innovation, there are differing views on how this should be funded. Primarily, customers believe these costs should be covered by:

- **Car companies** – Industries need to invest in their own research and development. The cost of doing so should be factored into the end price of a product. In this instance, an electric vehicle.
- **Government** – The government should assist industries with research and development through funding. The government also has a responsibility to promote and fund innovation that will ultimately benefit the wider population.
- **Distribution companies** – Distributors have a responsibility to ensure the network is fit for purpose. Companies make profit from providing a distribution service and so should have budget set aside for testing, modelling and trials for new technologies.

In this instance, customers are hesitant to see these costs passed on to all end users. Once trials have been completed, there is more openness to bearing some cost for infrastructure investment.

“The companies that produce the vehicles. At the least they should make a contribution... it makes sense that they have to bear the brunt.” (Melbourne, younger)

“I think if you can afford to drive one of these cars then you should be prepared to pay more for your electricity. The people who make the cars and the government should be prepared for these costs exploring alternative options through testing and trials.” (Regional, older)

“The industries that would benefit (financially) the most should be paying the most to research, trial and test new and better ways to improve this sector, it's in their interest. That said, governments could (and should) offer any and all assistance they can to help make this happen – this can be done in a myriad of ways.” (Regional, older)

“Research and development costs are always passed down the line to the end-user, us the consumer, and becomes one component in the final pricing of a product. So it is not a choice on who should pay at the end of the day, it's always the consumer who pays.” (Regional, older)

“The distributors should be responsible for testing, trials, analysis, etc. Ultimately, it is their responsibility to provide a network that is fit and stable for use, especially seeing as they make money off it. This cost should not be passed on to consumers.” (Regional, younger)



The amount of electricity needed to charge an electric vehicle is surprising

Participants in the focus groups were provided the following information:

‘An electric car with a typical daily commute of 40km requires roughly 6–8 kilowatt hours of energy to recharge, which is equivalent to the daily needs of a small household. In other words, if you purchase an electric vehicle, the impact on the local electricity network is about the same as adding a small house to the neighbourhood.

Unlike showering, cooking and heating our homes, it is possible, when a car is not immediately needed, to shift the demand to other times, such as overnight, when there is more capacity in the network.’

“I’m surprised that one car is equivalent to the daily needs of a small household, that seems like a lot to me. If I understand correctly, that would mean that if everyone were to purchase an electric car, the power demand would be approximately doubled, if not more as most households have more than one car. I wonder how it would work with households who have four or more cars needing charging at the same time.”

(Regional, younger)

“I am astounded at the requirements to recharge. However this does not change my views in relation to user pays. It is fortunate that much of the recharging will be done at off-peak times so perhaps this could be encouraged by off-peak rates.”

(Regional, older)

Positives:

- ✓ Provides important context on the amount of electricity needed to charge electric vehicles.
- ✓ Allows customers to understand that charging electric vehicles is an everyday activity that has greater flexibility than other types of activities.
- ✓ People spontaneously suggest that electric vehicle owners should be incentivised with lower rates to charge during off-peak periods.

Questions/ concerns raised:

- The notion of potentially doubling the electricity needs of neighborhoods can be a confronting prospect.
- The information outlines the electricity requirements of just one car. With some households potentially purchasing multiple electric cars, people are worried that the load on the system will be crippling.



The amount of investment needed provides context but figures can be polarising

Participants in the focus groups were also prompted with the following information:

‘The required investment in network and generation infrastructure, over the next 25 years or so comprising preparation and upgrades to the electricity system to cater to increased uptake of electric vehicles, is of the order of between \$6.3 and \$9.7 billion.’

“Is there any breakdown per average household? Is there a forecast of how many electric cars?” (Melbourne, younger)

“Over 25 years, that cost doesn’t seem astronomical for upgrades. I do not think this is a social responsibility, as power bills are already so high, this will impact on the vulnerable.” (Regional, older)

“That seems like a lot of money to spend on something that I really can’t see huge benefits to. I may need to better inform myself about electric cars as at the moment, with what I’ve learnt here, I really don’t see any great benefits to switching to electric.” (Regional, younger)

“The figures involved aren’t surprising to me. I agree that the need to prepare for the future of not just electric vehicles but everything future related is a social responsibility – and not just the costs, but the consequences will inevitably be borne by everyone one way or another – whether we like it or not.” (Regional, older)

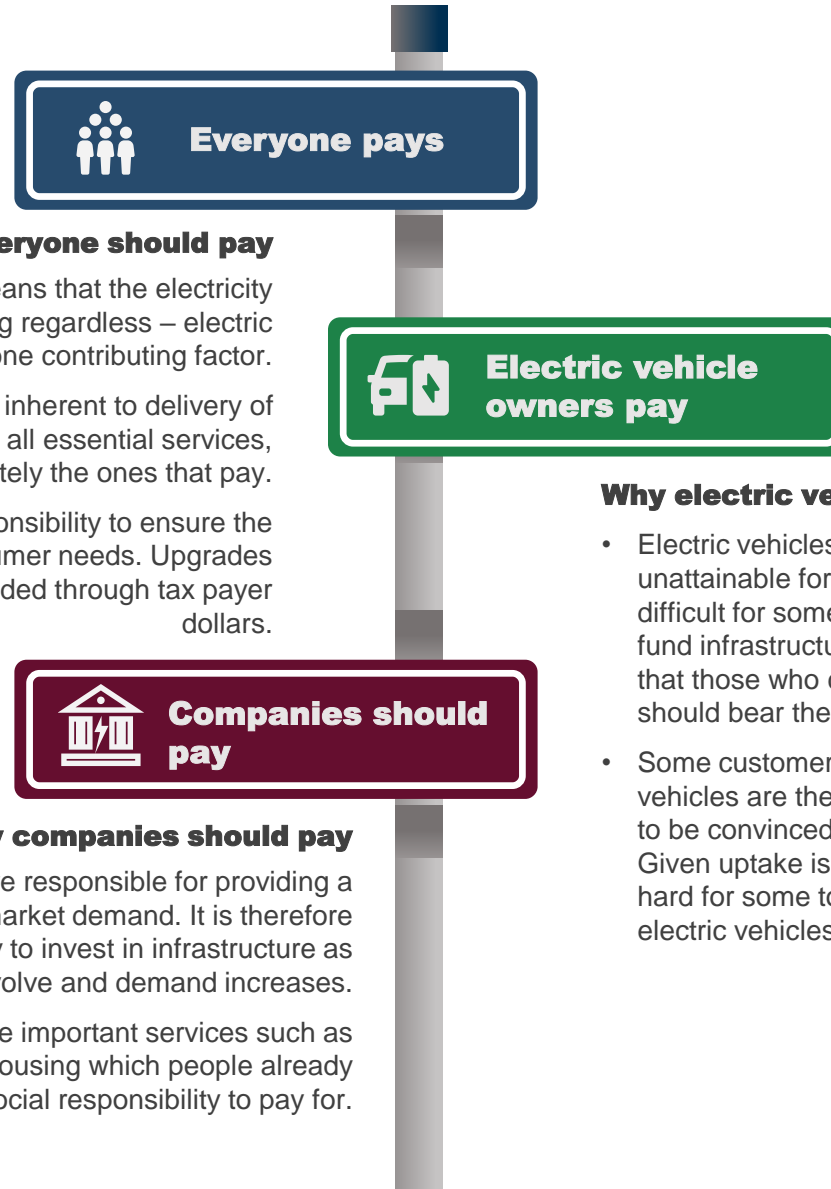
Positives:

- ✓ For some people, the potential cost of upgrades isn’t as high as they may have thought. Those that hold this view are able to recognise that the outlay over 25 years is potentially manageable, meaning customers may not have to bear a large cost.

Questions/ concerns raised:

- The potential outlay can be polarising as people focus on the amount and tend not to take in the 25 year timeframe.
- People are seeking information on the forecasts of electric vehicle ownership in the future to provide context to these figures.
- Importantly, customers want to know how much it will cost an average household – this is the information they need to form a view on the outlay. Essentially, they want to know what it will mean for them.
- In the absence of a real and tangible benefit to customers (such as decreased cost of electric vehicles), the cost of upgrades may not seem worth the outlay.

There is a spread of views on who should bear the cost of innovation to prepare for the future of electric vehicles



Everyone pays

Why everyone should pay

- Population growth means that the electricity system will need upgrading regardless – electric vehicles are just one contributing factor.
- Technological changes are inherent to delivery of all services. As for all essential services, consumers are ultimately the ones that pay.
- It is a government responsibility to ensure the power grid meets consumer needs. Upgrades should therefore be funded through tax payer dollars.



Electric vehicle owners pay

Why electric vehicle owners should pay

- Electric vehicles are perceived to be currently unattainable for the wider population, making it difficult for some to swallow having to pay to fund infrastructure. This drives a perception that those who can afford electric vehicles should bear the cost of upgrades.
- Some customers are still not sure electric vehicles are the way of the future. People need to be convinced there will be mass-uptake. Given uptake is currently relatively low, it is hard for some to envision widespread use of electric vehicles in the future.



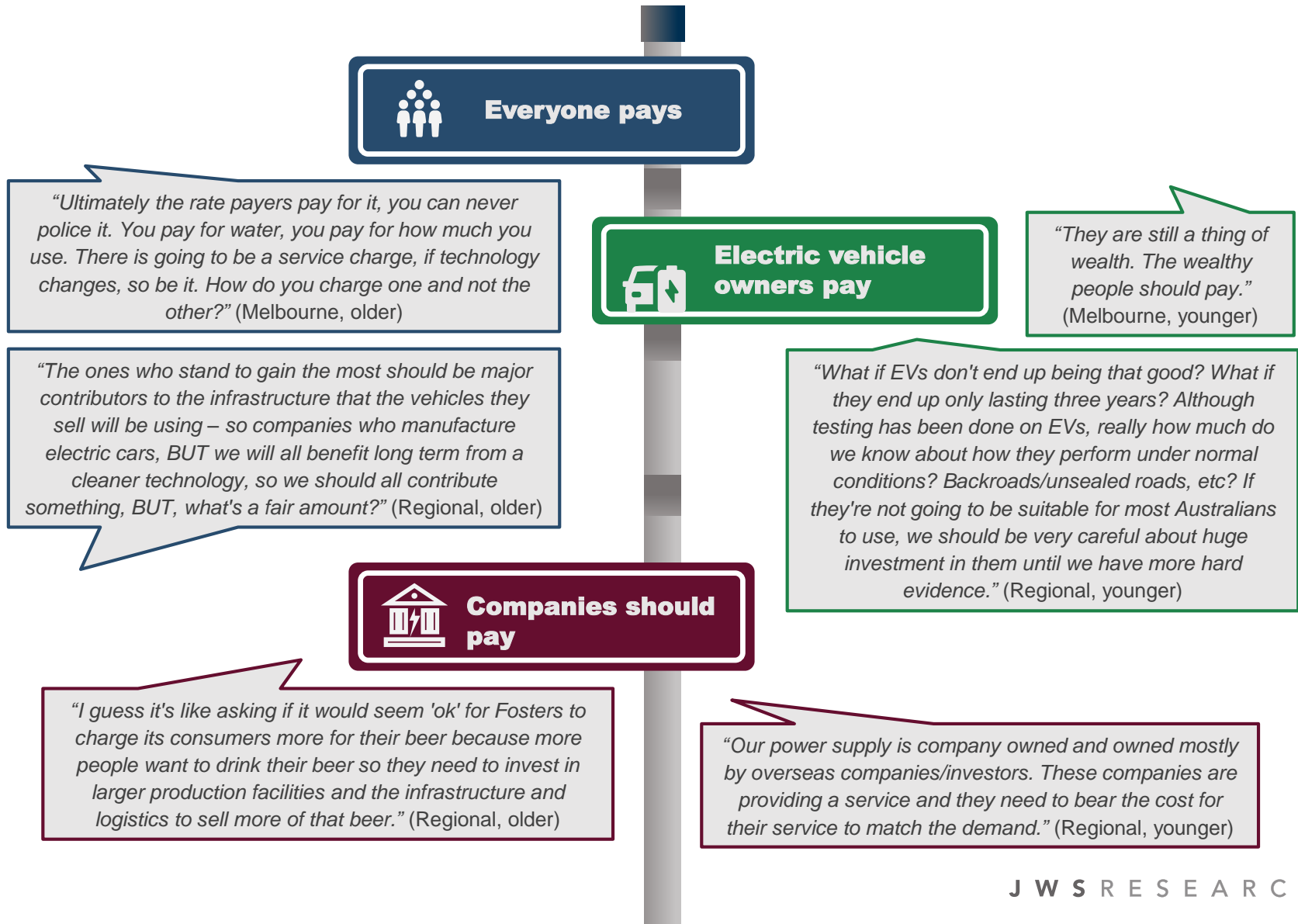
Companies should pay

Why companies should pay

- Companies are responsible for providing a service to match market demand. It is therefore their responsibility to invest in infrastructure as technologies evolve and demand increases.
- There are other more important services such as healthcare and housing which people already bear a social responsibility to pay for.



Views on who should bear the cost of innovation to prepare for electric vehicles: Select verbatim comments

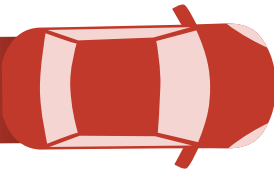


Customers tend to agree that upgrades to infrastructure to cater for new technologies should happen faster



In the main, customers feel infrastructure investment and upgrades for new technologies should occur as fast as possible. There is a view that Australia often lags in this area and customers are mostly in favour of the system being prepared for the future.

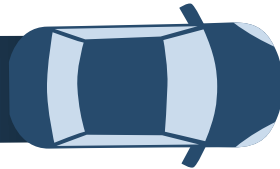
Upgrade at slower pace



Some people hold the view that a cautious approach should be adopted – there is no guarantee that electric vehicles will be adopted by the masses. In this context, a ‘wait and see’ approach is considered the best option.

“I’m not sure how fast it’s going now, but I’d say take it fairly slowly. I don’t think electric cars are very popular yet, and who knows maybe they’ll never get super popular (or may not get super popular for a long time). There are other things that electricity companies need to do that I think are more important (increase efficiency to reduce costs, solar administration improvements, etc.).” (Regional, younger)

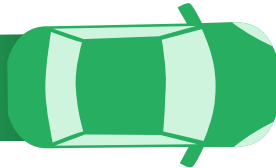
Upgrade at current pace



Some people are torn between recognition that new technologies need to be prepared for, but not yet convinced of the benefits. The best option is to keep at the current pace and ‘play it safe’ until there is a clear need identified.

“I think it’s something we need to prepare for.. I’d hate to see a huge boom for electric vehicles and then not the resources to use them. But I also don’t think it’s something we should rush into... perhaps just keeping at the same pace for now.” (Regional, older)

Upgrade faster



The more common standpoint – the best option is to prepare for the inevitable future and fast track adoption. Australia has a poor track record of this so now is the time to think and plan ahead.

“Faster and to think ahead. Much easier to be ahead of demand and easier to upgrade when the system is not under duress. Compared to our road/public transport network which is always behind demand and works then create larger disruptions/delays.” (Regional, younger)

“If more people are going to be driving electric cars then we will need to upgrade the electricity network quicker to cater for new technologies as we will be drawing a lot more power with running the cars and homes.” (Regional, younger)



Who should pay for infrastructure investment for solar panels is again a divisive issue

The initial reaction among some people is that the government and those with solar panels should pay for the necessary upgrades. In a financial sense, the benefit to the wider population of increased solar panel uptake is not entirely clear and this presents as a roadblock to accepting the need for the whole community to bear some cost.

However, relative to electric vehicles, solar panels are considered more attainable for most people, especially those who own their own home. There is an assumption that solar panels will soon be accompanied by batteries to store electricity. These can be used to help support the grid during peak periods and potentially reduce the need for major upgrades. There is a concern however, that burdening solar users with high tariffs, high connection fees or an inability to feed into the grid, may discourage people from installing solar panels in the future.

Some people recognise a need for everyone to contribute to the cost of upgrades, as (almost) everyone uses the grid in some way.

Ultimately, customers are hesitant to see any increases on their bills as cost of living pressures are already high. Funding through taxes is a way to ensure lower income earners are not as drastically effected.

"This isn't taking into account solar panel batteries, batteries will get better. If the solar panel has a battery, then they are not going to be using the electricity grid... if you have a whole lot of people with batteries, and you hit that peak demand, they can use their batteries to feed into the grid." (Melbourne, older)

"It always comes back to us. Ultimately it should be everybody because it is going to benefit everybody." (Melbourne, older)

"Look perhaps I would say here, that a portion of the upgrade costs could be distributed between solar panel users... with bills being dramatically lowered, I think it's something that could be considered. I am looking into using solar in the future and I would be prepared to pay a small portion of the upgrade costs for the network." (Regional, younger)

"Again should be user pays, but this disincentivises solar uptake." (Regional, younger)

"People who are in thresholds who don't pay tax, they are not paying for it. They have paid for it historically when they paid tax. Everyone is paying for it in levels, which I think is fair." (Melbourne, younger)




"Yes, we should all pay, people without panels are relying on the system in different ways than people with solar panels but they are all users and should therefore share the cost. Passing it through electricity bills is a bit counterproductive though as the increased cost will discourage compliance and uptake." (Regional, younger)

Electric vehicles are viewed differently to solar panels and air conditioners



Primarily, solar panels are seen to be more accessible, more popular and more affordable; all while considered to be reducing the load on the grid. A potential win-win scenario. Solar panels act as an enabler to moving away from fossil fuel reliance which reduces emissions. This is seen to be a responsibility borne by all.

Air conditioners are considered a necessity and so their use cannot be avoided. However, there is recognition that people could be educated on the need to consider the setting on their air conditioner during peak periods.

			
Need	Luxury item	Not essential but desirable	Necessity
Accessibility	Only to a few	Accessible to most	Accessible to all
Popularity	Minimal	More mainstream	Widespread
Price	Expensive	More affordable	Affordable
Efficiency	Not yet efficient	Efficient	Efficiency can vary
Impact on grid	Extra strain	Decreasing load	Extra strain

"The need to increase our use of solar and wind power instead of fossil fuels is a responsibility for everyone, world wide. In saying that, the government and manufacturers should bear the majority of the cost as the consumers are already paying for the panels and installation. I don't think it's different to the upgrades to the network." (Regional, older)

"Electric vehicles are only afforded by a few so far so it's different to day to day living for everyone. Electric vehicle prices will come down with demand and also as batteries get better. Solar power is for everyone, but electric vehicles not yet." (Regional, older)

"Air conditioning is not a luxury but a necessity for many, but an electric vehicle is a luxury." (Regional, older)

"I think the difference is with solar it is popular and efficient, whereas electric cars are not popular yet and given the amount of power they need, not efficient in terms of drain they would be on current grid. Solar reduces strain on grid, electric cars increase it." (Regional, younger)



Pricing for new technologies

The impact of electric vehicles on peak demand is a concern; spontaneous reactions are to shift charging times



Once aware of the amount of electricity required for an electric vehicle (equivalent to a small house), people are quick to make a connection between the potential simultaneous charging of electric vehicles and the increased load this would put on the system.

“If everyone decides to charge cars at the same time, it would put a huge load on the existing infrastructure. Maybe if people waited and charged over night it might make some difference as there isn't a huge load overnight but if everyone did that it would make a peak period over night so it's a hard one.” (Regional, younger)

However, the relatively low uptake of electric vehicles means some customers are hesitant to support upgrades that would address the potential risks.

“I just feel that unlike solar, electric cars aren't showing themselves to be a popular, accessible option yet. I'd want EVs to be much more popular before investing significant amounts of money into EV-specific infrastructure, particularly if it directly increased my bills.” (Regional, younger)

Home batteries are seen to be the missing link to maximising power generated by solar panels. These will allow consumers to charge their cars during peak periods without putting increased strain on the grid.

“If more homes had battery back up systems that are charged during the day, then that stored energy could be used as required to recharge electric cars. If more homes had this capacity, then there would be less need to continuously upgrade the network to deliver the massive needs of the end users of energy, but then the distributors wouldn't be selling as much energy. Also they'd not need to have such a huge upgrade of the distribution networks to deliver that energy.”
(Regional, older)

Customers spontaneously suggest that charging electric vehicles should be shifted away from peak demand periods through the use of timers and smart meters. However, there is a concern that this would simply create a new ‘peak period’ and result in higher tariffs across a longer period of the day.

“Maybe cars could be charged via a specific module or charge point that can only be switched on at certain times. Full charging could take place overnight where the demand for electricity is at a minimum.” (Regional, older)

“I don't see it being that effective – if everyone postpones peak electricity usage till off-peak times, peak demand would only be delayed.” (Regional, younger)



Relative risks and opportunities of electric vehicles

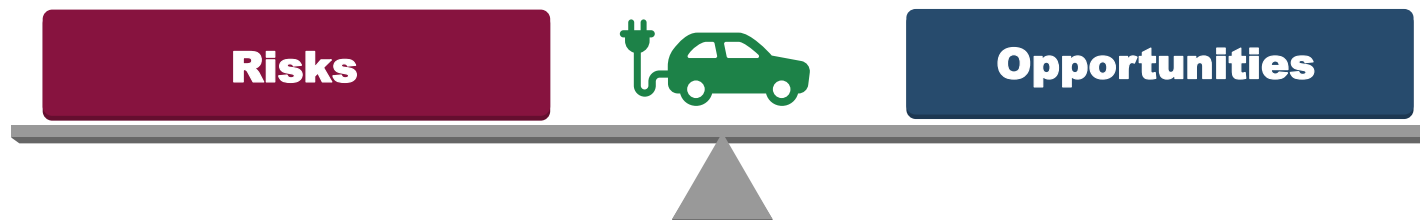
Consideration of balanced information on the possible impacts of increased penetration of electric vehicles presents both risks and opportunities. In the absence of guarantees and concrete information, it is difficult for customers to determine if electric vehicles are a risk or an opportunity overall.

While there may appear to be more opportunities, people are unclear if all of these opportunities will eventuate.

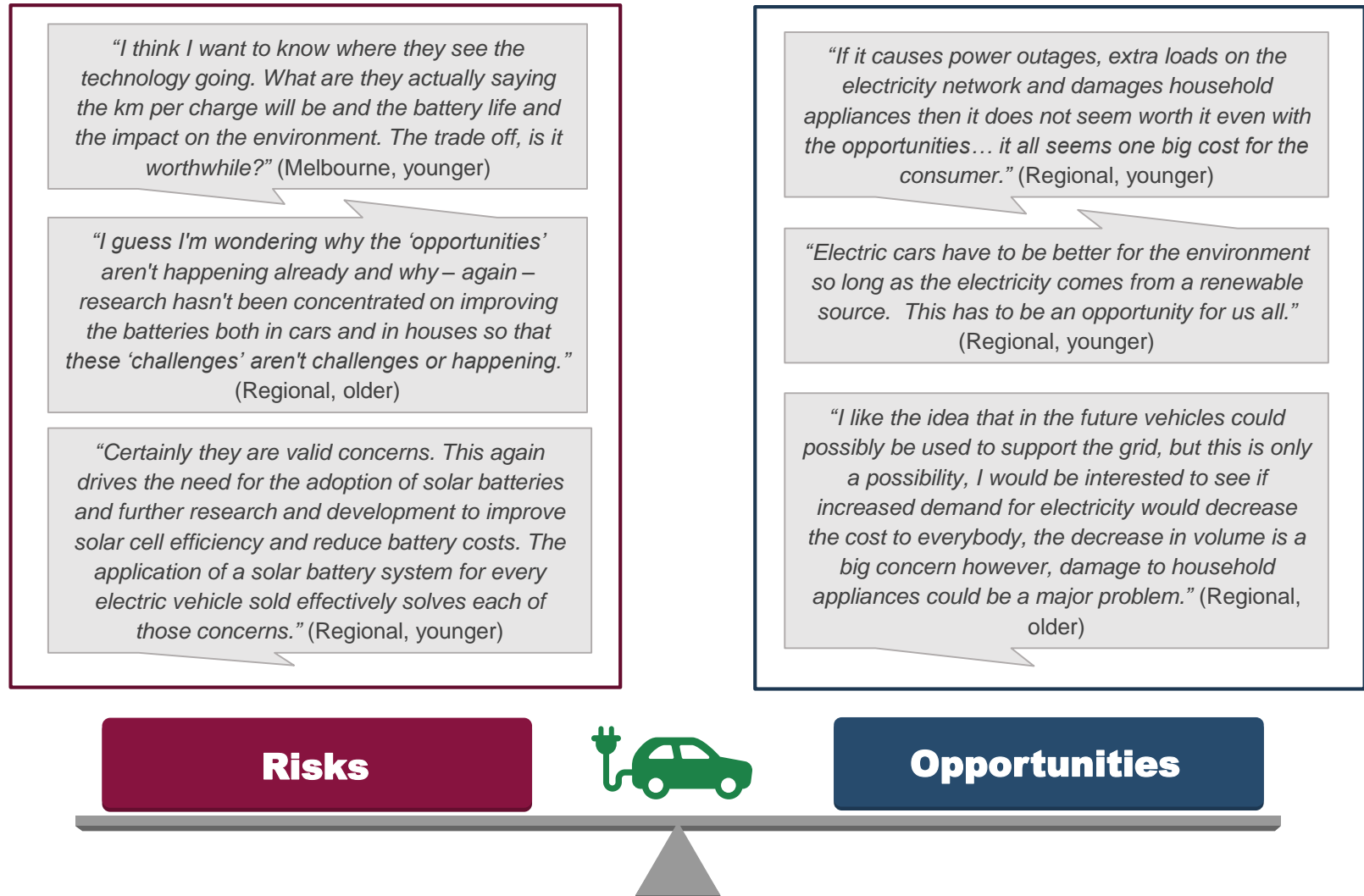
Some people expect any issues (both risks and opportunities) will resolve themselves as uptake proliferates. There is an assumption that 'bumps in the road' are common with new technologies, but society will figure things out as usage becomes common.

- The potential to overload the grid and damage appliances is a prominent concern.
- Rapid uptake of electric vehicles presents a possible risk to reliability of power if the extra strain on the grid is not properly planned for.

- There is opportunity if solar can support electric vehicle charging. If the source power used to charge electric vehicles is renewable (either from household solar panels or through more renewable energy in the grid), there is greater opportunity for all through reduced emissions.
- A potential decrease in the unit cost of electricity is appealing, but some are sceptical this will occur.
- The possibility for electric vehicles to support the grid during peak periods is appealing but customers are unsure if this is realistic.
- Perceptions that more research and investment into batteries for both cars and households will help solve the potential risks posed by electric vehicles.



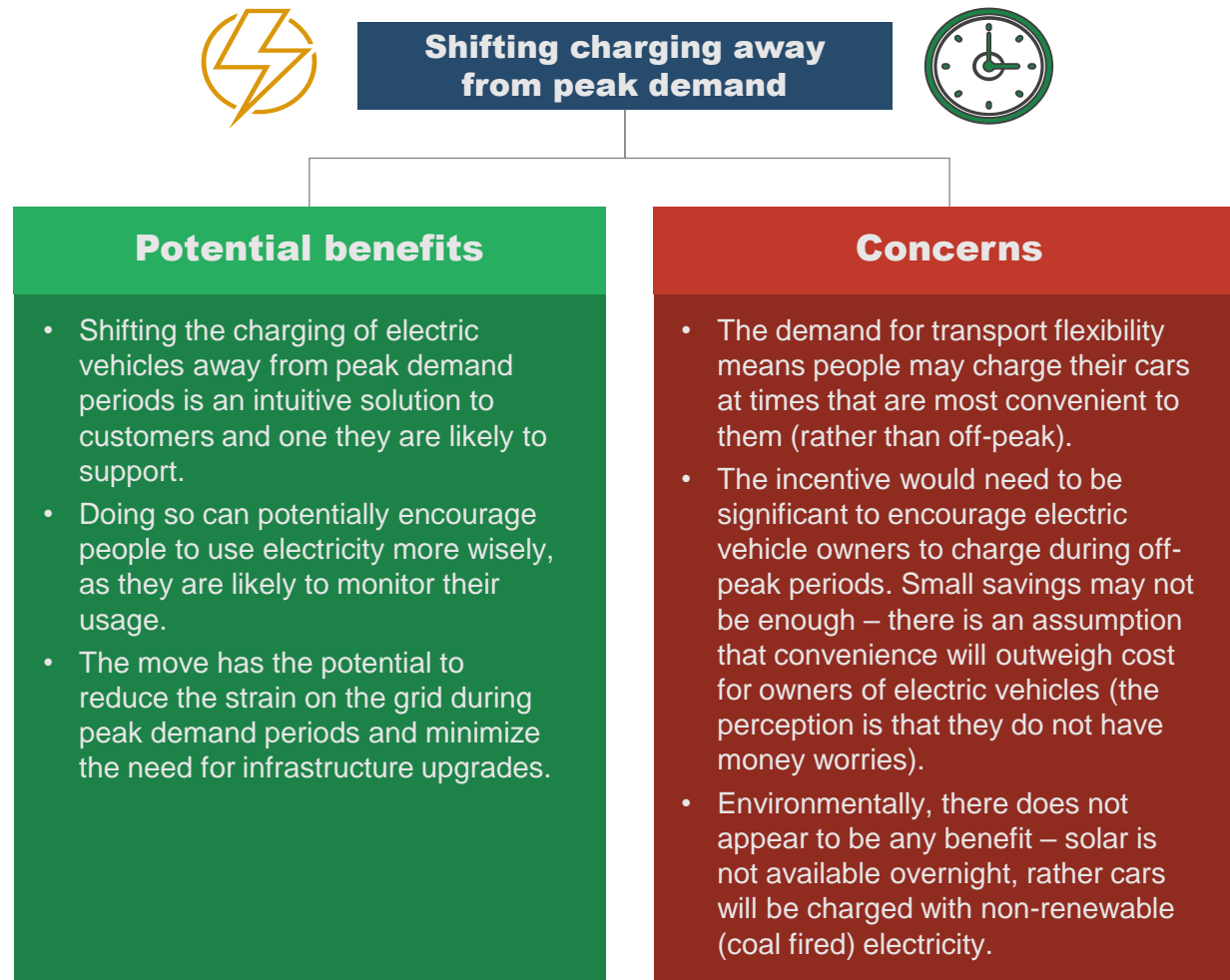
Relative risks and opportunities of electric vehicles: Select verbatim comments



Shifting the charging of electric vehicles away from peak demand presents a number of benefits and concerns



The notion of moving charging of electric vehicles away from peak demand periods is welcomed by customers. However, there are some concerns that may need to be considered.



Shifting the charging of electric vehicles away from peak demand: Select verbatim comments



"The benefit of this is that it would encourage people to use power more wisely. My only concern with this is that power companies could use this as a profit making tool and raise prices during times they don't need to, so this would have to be monitored or mandated."

(Regional, older)

"I don't see it working, if you have a million small houses using electricity, and demand using it overnight, you have no solar availability, you have to use more coal, I see it sort of being detrimental, if the whole point is environmental sustainability."

(Melbourne, younger)

"I think this would be a good idea but not sure a lot of people would take note as people are going to charge their cars when they need them whether it is in peak time or not. Would this also be for people who don't own an electric car as I think everyone would want the same discounts."

(Regional, older)

"Nice idea, but I just don't think it would work without a pretty decent incentive. People are getting accustomed to having everything at the tip of their fingers – waiting around to charge a car to save a few dollars probably won't cut it."

(Regional, younger)

"People will use electricity at their convenience especially if it effects their mode of transport, I'd expect most electric vehicle owners to just accept the added costs of charging during peak times as part of the cost of ownership."

(Regional, younger)

Time of use tariffs are the way forward, although there is some expectation that this would be a choice



In principle, enforcing a time of use tariff for electric vehicles is a logical step that would help ease some of the pressure on the electricity network. There are calls by some people for a system such as this to be implemented now, by forcing people to sign an agreement when they purchase an electric vehicle.

"If it can be proven that a time of use tariff would reduce peak demand from EV vehicle owners, then sure, a time of use tariff agreement should be signed at the point of sale."
(Regional, younger)

While it may reduce flexibility in terms of charge times, there is a perception that encouraging this now through pricing structures, will ingrain this habit into consumers faster. This will ensure all future electric vehicle buyers understand time of use tariffs are a requirement.

"If people want to save money, it will. It is not as flexible... it's a good habit to get into anyway." (Melbourne, younger)

"I agree with the policy of increasing pricing during peak hour, if you have to charge in peak time be prepared to pay the premium and habits do change. Look at plastic bags. Everyone brings their own bags now, so we can change and pricing is one way of enforcing this change." (Regional, older)

Further, forcing electric vehicles on to a time of use tariff is generally viewed as a better approach to major and immediate infrastructure upgrades. However, some customers see this as merely delaying the inevitable. As the population increases, so too will demand on the electricity system. Consequently, investment and upgrades will be required at some point.

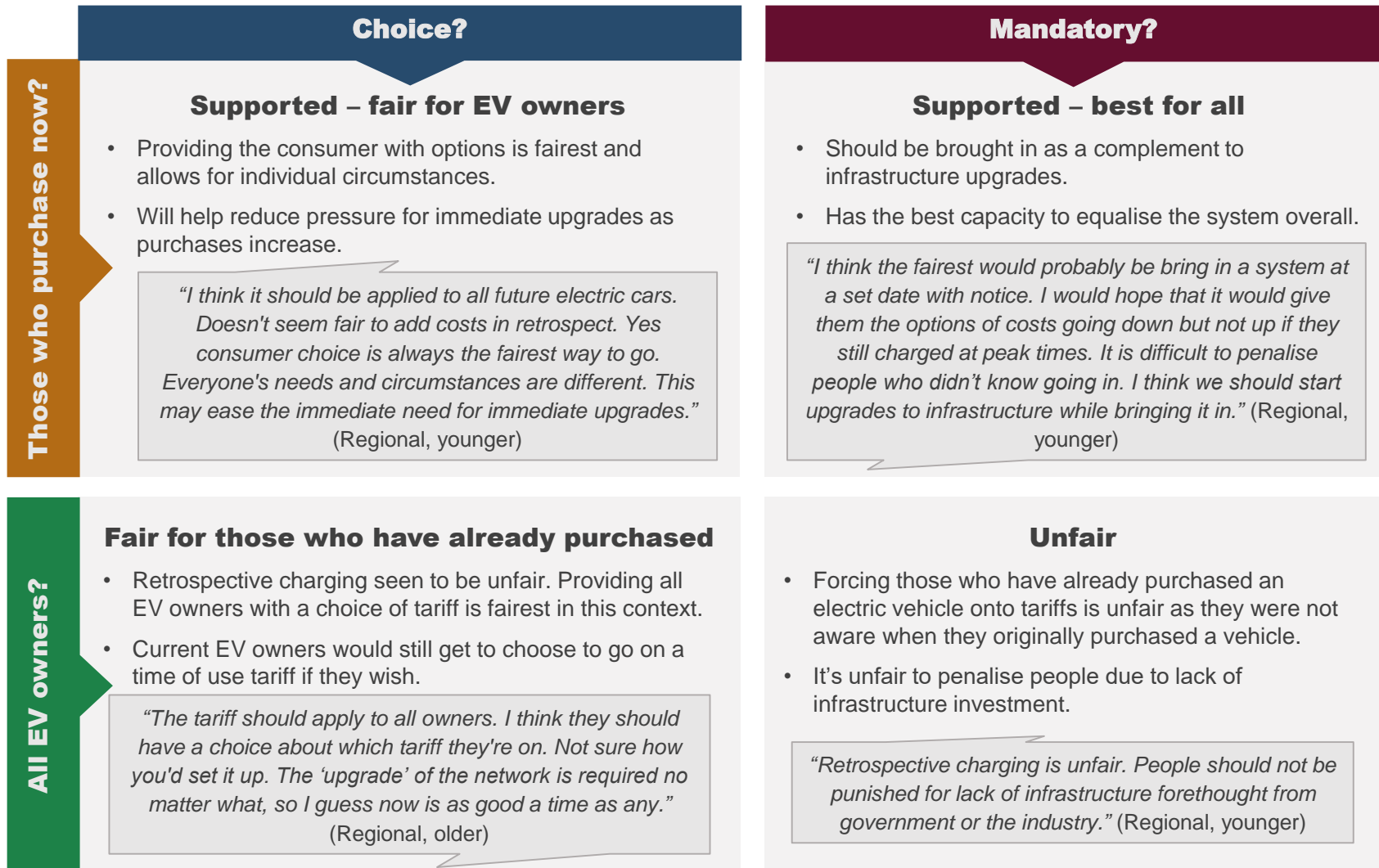
"Yes a better approach than to upgrade the whole network but I still have my doubts. Surely increased pressures of population will demand upgrades be done anyway."
(Regional, older)

Some consideration is given to people who may not be able to charge their vehicle during off-peak periods, e.g. those who work hours that do not align with off-peak periods. In this situation, forcing people onto a time of use tariff is considered unfair.

"It would definitely disadvantage a lot of people and I think would be extremely problematic for people with strict fixed hours – flexible work isn't as widespread as people make out, and just isn't possible in some roles. Those people could lose out. I also wonder what the reaction would be if, say, there was an emergency and someone hadn't charged their car, and thus couldn't get anywhere." (Regional, younger)



Time of use tariffs should be introduced now, however charging people retrospectively is considered unfair



A large, stylized letter 'W' that serves as a background graphic. It is filled with a satellite night map of the United States, showing city lights and road networks. The 'W' is positioned on the right side of the page, with its leftmost stroke extending towards the center.

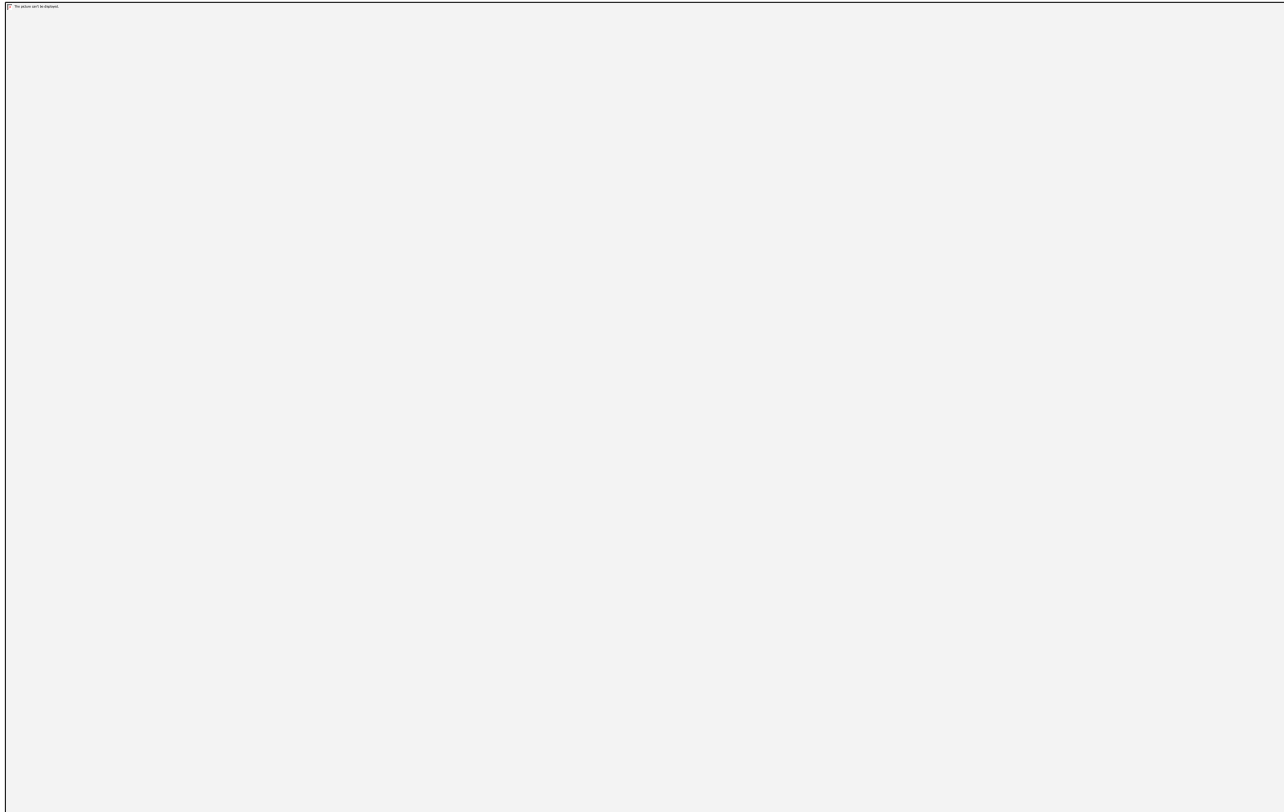
Appendix: Stimulus material



Handout: Components of the electricity bill

Distribution is around 31% of an average bill.

Residential customers pay an average of \$86 per quarter for distribution services.



Source: Australian Energy Market Commission,
Electricity Price Trends Report, December 2018

Note: Figures are based on projections for 2019.



Handout: Peak demand

'Peak demand' is when electricity demand reaches its maximum levels at a given point in time. This happens when customers are on average using more electricity each at the same time (e.g. all turn on air-conditioners at once).

A freeway can be used as a way to explain the idea of peak demand. Electricity networks, like metropolitan freeways, aren't used to full capacity all the time: there are 'peak' periods and 'off-peak periods'. And, like freeways, capacity isn't the same across the network: a small part of the network can be highly congested while the rest is flowing freely. However, unlike traffic, transportation of electricity can't 'slow down' when there is congestion. If demand can't be safely met, it must be shed (i.e. parts of the network are turned off, and customers experience blackouts).

Electricity demand reaches its maximum levels usually only for a few days each year in summer (usually to run air-conditioners during heat waves), and rarely for more than a few hours. Historically, a substantial portion of electricity networks were built to meet these maximum peaks, but would sit idle for the rest of year.

To prevent blackouts at these times, distributors need to spend money to increase the capacity of the network to cope with demand on these peak days. This may mean upgrading power lines, transformers and other pieces of network infrastructure, so the network can deliver more power safely and reliably, even though these peaks happen only on about 4 or 5 days each year.

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